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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 10/719,020 | 11/24/2003 | Akira Matsuda | 032130 | 9168 |

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| EXAMINER | |
|---|---|
| LAM, CATHY FONG FONG | |

| ART UNIT | PAPER NUMBER |
|---|---|
| 1794 | |

| NOTIFICATION DATE | DELIVERY MODE |
|---|---|
| 09/29/2009 | ELECTRONIC |

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

patentmail@whda.com

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 10/719,020 | MATSUDA ET AL. | |
| | Examiner | Art Unit | |
| | Cathy Lam | 1794 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *09 September 2009*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *20,22-26 and 33* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *20,22-26 and 33* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

## DETAILED ACTION

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on Sept. 09, 2009 has been entered.

### *Claim Objections*

Applicant amended claim 20, but did not make changes to the status identifier.

### *Claim Rejections - 35 USC § 112*

2. Claim 20 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

It is indefinite as to how "2.3 to 18.0 **mg/dm$^2$**" relates to a thickness of a layer. The unit as claimed is a mass/area, the unit is not equivalent to a length unit. Clarification is required.

### *Claim Rejections - 35 USC § 103*

3. Claims 20, 22-26 and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Atobe (JP 59-50190).

Atobe teaches a brass plate coated with a NiP resistance layer having 16.5wt% of phosphorus (working Example 3). The plating solution includes nickel sulfamate and

hydrochloric acid; and has a pH value of 0.8 at a 60°C bath temperature and at a 6 $A/dm^2$ current density (see working example 1).

Atobe's NiP electroplating bath comprises nickel sulfamate, phosphoric acid, phosphorus acid and a nickel chloride (salt). The nickel sulfamate has a concentration preferably 300-500 g/l (page 2 L 9-11). The phosphorous acid at a concentration of 30-100 g/l (page 2 L 16).

Atobe may not exemplify the plating composition having the claimed relative amounts of Ni sulphamate, phosphoric acid and phosphorous acid. However, Atobe suggests a range of effective amounts of each that would be encompassed by the claimed amounts. One skill in the art would form a coating bath composition having the claimed amounts of nickel sulphamate and the phosphoric and phosphorous acids because an optimum plating composition involves only routine experimentations.

Atobe teaches the metal foil being a steel foil (i.e. iron alloy foil) or a brass foil (i.e. Cu-Zn alloy), but is silent about its surface roughness (Examples 2 & 3) and the resistance layer thickness.

In view of Atobe's teaching, it would have been obvious to choose a low surface roughness, particularly < 2.5 μm because Atobe's goal was to form a mirror surface plated metal foil. In example 3, the brass foil after the NiP plating has a mirror surface of 1.0 μm. Regarding to the resistance layer average thickness, the examiner is taking the position that Atobe teaches the same method and electroplating solution for plating a resistance layer over a conductive metal foil, one skill in the art could control the amount and/or thickness of depositing by adjusting the electrical current.

4. Claims 20, 22-26 and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rice et al (US 4888574) in view of Kazanovtse et al (WPI Derwent, vol 29).

Rice teaches a multilayered printed circuit board material and a method for producing the board material. The circuit board comprises a substrate, an electrical resistance material layer, and a conductive material layer.

The conductive material layer is copper. The resistance material layer comprises a nickel-phosphorus alloy having up to 30 weight percent phosphorus, and the Ni-P alloy layer is produced by an electroplating technique.

Rice although teaches it is not desirable to include sulfate salts or chloride salts, but Example 1 (column 3 L 33-35) and Example 5 (col 4 L 22-25) do describe a nickel plating bath containing nickel sulfate and nickel chloride.

Rice's electroplating bath temperatures and plating bath pH values which also lie within applicants' claimed temperature range and claimed pH value range (column 1, lines 44 to 61; column 2, lines 17 to 61; and column 3, line 28 to column 5, line 9).

Rice does not teach or suggest the usage of nickel plating baths that contain sulphamate ions.

Kazanovtse. teaches a nickel plating bath composition for the deposition of nickel-phosphorus alloys on a cathode such as copper or stainless steel. The nickel plating bath comprises nickel sulphamate, nickel chloride (salt), orthophosphoric acid, and zinc phosphate.

Kazanovtse discloses a method of forming a nickel-phosphorus alloy coating on a conductive substrate by using a sulphamate-orthophosphoric acid plating bath under the following conditions: pH = 1.2 to 1.6; temperature = 70 to 75° C; and current density of 30 $A/dm^2$ (see the English-language Abstract in WPI World Patent Information Derwent).

While Kazonovtse teaches nickel sulphamate amounts lower than those claimed, however It would have been obvious to one having ordinary skill in the art at the time the invention was made to have the desired amount of nickel salt, such as the claimed amounts of nickel sulphamate salt, for use in a nickel plating bath as taught by Rice in view of Kazanovtse because such amount can easily be determined in a routine experimentation.

Rice motivates using non-nickel sulfate salts and Kazanovtse motivates nickel sulphamate plating compositions for forming NiP layers. A person skilled in the art of nickel electroplating would have been motivated to rely on Kazanovtse in conjunction with conventional deposition techniques for deposition using nickel sulphamate of the claimed amounts of nickel sulphamate because a result- effective variable (such as the usage of a sulphamate salt in a nickel plating bath) can be optimized by a skilled person in order to achieve a recognized result (such as a Ni-P alloy plating having improved structural properties or characteristics). See In re Boesch, 205 USPQ 215 (CCPA 1980). Generally, differences in concentration or temperature will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such concentration or temperature is critical.

***Response to Arguments***

5. Applicant's arguments filed on 09-09-09 have been fully considered but they are not persuasive. The prior art of record continue to encompass the concept of the present invention. Applicant traverse the art rejection and raises the following issues:

A. The thickness of the resistance layer in Atobe is 5 times more than the upper limit of the claimed range.

B. Atobe teaches a "high-class accessories" or "decorative components" not a circuit board material.

C. Atobe's resistance layer could not lead to a fine line circuit pattern, because it has a thickness range of “1 to 4 μm”.

D. Atobe’s does not teach etching the conductive metal foil to make a circuit pattern. There is no motivation to etch Atobe’s product to make a circuit pattern. Atobe’s Ni-P layer serves as a surface layer having a decoration purpose with a mirror surface.

E. Kazanovtse teaches a Ni-P having a thickness of 8-10 μm which is 100 times more than the claimed average thickness.

F. The concentration of the nickel sulfamate disclosed in the specification is not an admission of prior art.

In respond to the above issues:

A. There is no showing of any *linear* relationship between the resistance layer material density and it thickness (or length). Applicant is now claiming the density of the Ni-P ($mg/dm^2$), the examiner does not accept 18.0 $mg/dm^2$ equivalent to a 0.2 μm.

B.&D. Atobe teaches a same electroplating method that is to electroplating a conductive foil with a Ni-P material. The electroplating solution is the same as the claimed solution. Whether or not it is a circuit material is irrelevant, Atobe only shows an intended use, on the other hand Atobe has not limited to what the product was used for. The fact that a "decorative components" would mostly likely to be etched or altered on its surface to form some surface topography.

C. There is no place in Atobe teaches a wiring pattern having the *accused* thickness.

E. By changing the electrical current in the plating bath, the Ni-P thickness can be controlled. Furthermore, applicant has not claimed any thickness of the Ni-P layer.

F. The concentration of sulfamate according to one's desired. The present invention is directed to a method for preparing a circuit board material. The prior art of record clearly disclose the same field of invention.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Cathy Lam whose telephone number is (571) 272-1538. The examiner can normally be reached on 9am-6pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jennifer McNeil can be reached on (571) 272-1540. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Cathy Lam/
Primary Examiner, Art Unit 1794